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DUODENAL ALIMENTATION.[1]

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When Einhorn first described his method of duodenal alimentation about a year and a half ago, I realized its possibilities and began using it in certain selected cases. After a considerable experience I regard duodenal feeding as a distinct mark of progress in the treatment of those conditions where rest for the stomach is indicated. The principal field for its usefulness lies, of course, in the treatment of certain gastric and duodenal ulcers, but its scope can be legitimately enlarged by including certain other conditions, as will be shown later.

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For those who are not acquainted with the duodenal tube, I will briefly outline the technique of its use. The tube is swallowed by the patient at bedtime, with the aid of water. When the first mark on the tube is at the teeth the bucket on the end is entering the stomach. The second mark indicates the distance from the mouth to the pylorus. During the night the capsule, provided there is no obstruction, will usually have passed the pylorus and the third mark on the tube should be at the teeth, indicating that the end of the tube is *in situ*, well down the duodenum.

Before starting the feeding it is well to make sure that the tube is really *in situ*. This is done in several ways. Gentle traction will develop a slight resistance if the tube is in the duodenum. Aspiration through the tube will often recover golden-yellow duodenal juice and not gastric secretion. Lastly, and most certain, if the patient be given some liquid to drink by mouth and aspiration is immediately performed it will not be returned through the tube as would be the case if the latter were coiled up in the stomach.

When certain that the tube is in place we can proceed with the feeding. The food which has been found most satisfactory is a mixture of milk, sugar of milk, and raw egg. The amount given at a feeding should be small at first, 100 c.c. every two hours from 7 A.M. to 9 P.M., increased until 280 or 300 c.c. are taken at each feeding, if possible. When the patient is taking 280 c.c. of milk, one egg, and one tablespoonful of sugar of milk at each feeding he is receiving approximately 2840 calories for the total eight feedings in the twenty-four hours. As the average individual while in bed requires under 2000 calories to maintain his nitrogenous equilibrium, it can be seen that there is a liberal amount in excess for the purpose of building up the patient.

Einhorn uses the glass syringe to administer the food, and by means of a feeding table which fits over the glass of nourishment, is able to fill the syringe from the glass and by a manipulation of petcocks force the contents into the duodenal tube without disconnecting.

In treating my first 2 patients I thought it would be advantageous to employ a method like that of Murphy for giving salt solution per rectum, and so I have made use of gravity from a pint irrigating jar, connecting its tube to the duodenal tube by a glass connection and setting the rubber petcock so that the nourishment enters the duodenum slowly, about twenty-five minutes being required for the larger feedings.

Duodenal alimentation is not, as a rule, suitable for use in the home unless a nurse who has had some experience with it is in constant attendance. There are a number of points which must be adhered to rigidly or untoward happenings will occur. As a rule, if the patient's relatives are entrusted with giving the feedings some mistake will result in the patient being made uncomfortable or the tube being blocked up so as to necessitate its withdrawal in order to clean it.

The food must be administered at body temperature. Food normally entering the duodenum from the stomach is at body temperature, and so the former is not accustomed to shocks of too high or too low temperature, and resents such insults by distressing symptoms of shock, cold perspiration, flatulence, and distress, and perhaps even syncope. The mixture should be heated gradually, preferably in water, and should not be made too hot lest it become thick and lumpy from cooking of the egg. After heating it should be strained. This will help in preventing the tube from becoming occluded.

The food should be allowed to enter the duodenum slowly. Too rapid administration will cause flatulence and often the same symptoms as variations in temperature.

At the termination of each feeding a syringeful of water at body temperature should be injected; then the petcock closed; the syringe filled with air; the petcock again opened and the air injected, after which the petcock should again be closed before the syringe is disconnected. This keeps the tube cleared and clean. The management of the petcock is not trivial, as it might seem, and if, say, the petcock was not turned off when the syringe is removed, some of the food would likely rush back into the bucket and lower tube and be converted by the trypsin into a cheesy lump, defying removal until the tube is removed and cleaned. It is because of the importance of these details that one who has had experience should superintend the feedings.

Duodenal feeding is only to be chosen for certain cases. Certain ulcers with severe symptoms, which would heretofore have been treated at the beginning by rectal feeding for some days, may at once be put upon duodenal feeding. Again, in an ulcer which has not healed under a thorough course of medical treatment we should try duodenal alimentation before resorting to surgery. By so doing we can eliminate several of the factors which tend to prevent ulcer from healing, that is, the presence of acid in the stomach, irritation of food in the stomach, stretching of the stomach, and peristalsis. At the same time the body secures sufficient nourishment.

This method of treatment will not cure all cases of ulcer, and some may have to be operated upon later; but in all in whom I have tried it, the general condition of the patients has been decidedly improved, so as to render them better surgical risks. The following synopses of 2 cases which later came to operation show this point.

Miss M. T. D., aged thirty-four years, had symptoms for nine years, complaining of pain and tenderness in the left epigastrium, coming on from two to three hours after meals, and severe headaches. The pain was decidedly aggravated whenever she was much on her feet. There was no nausea or vomiting. Her gall-bladder was distinctly palpable and slightly tender, but not distended. The right kidney was palpable to the second degree. A spot of some tenderness was found on deep pressure, one-half inch below and one inch to the left of the ensiform. Splashing sound extended over the entire epigastrium to the navel. There was slight hypersecretion and an acidity of 64. The diagnosis was not clear for several weeks, as occult blood was absent from the stools, but this appeared later, at which time the thread test also became positive. After she had been on the rest treatment for two weeks and her symptoms were worse, if anything, it was thought best, in consideration of the probable long duration of the ulcer, to put her on duodenal feeding at once. She improved greatly on the treatment, but after a time her symptoms reappeared and a gastro-enterostomy was performed, an ulcer being found in both the stomach and duodenum.

Another case, that of Mrs. M., is interesting, as at operation later on, scars of two healed ulcers were discovered demonstrating that the duodenal feeding had been successful, but that other ulcers had developed after a year of health. She came to me with symptoms of recurrence of an ulcer, which had apparently been healed by medical treatment the year before. Her weight was only ninety-eight pounds. She complained of a severe epigastric pain and tenderness. Occult blood was present in considerable amounts and the thread test was positive. Operation was thought advisable, but it was decided to first try duodenal alimentation, as her general condition was very poor. The tube was left *in situ* for eighteen days, during which period her symptoms entirely disappeared. Her weight progressively improved, and in several months it reached 116 pounds, a gain of 18 pounds. Later the symptoms of ulcer recurred, and Dr. Howard A. Kelly found at operation several scars in the stomach from the ulcers healed by the former treatments and an open duodenal ulcer which was producing the symptoms at the time.

Ulcers at the pylorus, producing obstruction, may be treated with duodenal alimentation, provided the duodenal tube can be passed into the gut; but if the pylorospasm persists they then demand gastro-enterostomy. Duodenal alimentation or other forms of medical treatment should not be given too long a trial in an unhealing ulcer at the pylorus, even if not producing obstruction, because of the danger of malignancy. But in other ulcers this method of treatment should be instituted in nearly all cases after ordinary medical means have failed to produce a cure, and will often bring about happy results. I have never had a complete failure in any ulcer case in which I have used the tube, that is, one in which no improvement whatever was noted. Many complete cures have resulted, as far as can be determined, and the remainder were greatly improved.

The cases which were not of long duration have almost without exception done well, as in the following:

Mrs. H. C. M. had symptoms of two months' duration when she first consulted me. She complained of a burning pain in the stomach and pyrosis about three hours after meals, and in the early morning, relieved for a time by food, soda, or belching. Ulcer was not diagnosticated at first since examination failed to show tender spots, and the stool was negative for occult blood. The right kidney was palpable to the first degree and splashing sound was obtained over the whole upper abdomen as far down as the lower border of the navel. Free acid was 34 and total acid 48. Under a general reconstructive treatment she at first improved somewhat, but became decidedly worse while on her vacation, so that three months after her first examination she returned with exaggerated symptoms and a positive thread test. Duodenal feeding resulted in complete relief from her symptoms, and a negative thread test, which has persisted.

Mrs. O. came to me in the spring of 1911, shortly before I left town on my vacation. Her family history was good. She had been delicate as a child, and had always been troubled more or less with digestive disturbances. During the previous two years she had been having attacks of sharp pain in her stomach, which at first would come on several hours after her evening meals. She also complained of distress in the region of the sigmoid, more or less constant in the earlier hours of the day, which to a great extent passed off after bowel actions. There was a decided tendency to a relaxed condition of her bowels. She was troubled with a continuous dull headache. Chest organs were normal. Her abdominal walls were relaxed. Splashing sound of stomach reached from ensiform to one inch below navel. A good deal of tenderness was elicited by pressure over her sigmoid, but at no other point. Her hemoglobin was 75 per cent.; leukocytes, 10,400, with a polymorphonuclear count of 75 per cent. The urine showed a very faint trace of albumin. The feces showed a good digestion and no occult blood. Stomach digestion was good, free HCl being present with an acidity of 56 and no occult blood. Because of a tendency to diarrhea, the distress in her sigmoid in the early part of the day, the tenderness to palpation in that region, the blood picture, and her progressive loss of strength and some weight, I feared lest a beginning malignant change was occurring. However, as she and I were just leaving town for the summer nothing further could be done other than to regulate her diet, etc. In the early fall upon my return she again came to see me, and I found her general condition unchanged. Her chloroanemia was slightly more pronounced but the leukocytes and polymorphonuclear count were both quite normal. There was less sigmoid distress although the bowels were acting from three to eight times each day, the feces being always loose and mushy. However, the epigastric pains were now more pronounced and occurred from one to three hours after every meal, being worse after the heavier and more complex meals. Her bowels began to act from one-half to two hours after every meal, remarkably coincident with the onset of her pains. A point of marked tenderness was elicited below the right costal border, the thread test was positive, and occult blood was present when on a meat-free diet. She was put upon the conventional rest treatment for cure of ulcer, and kept there for several weeks, but without any marked amelioration in her symptoms for any length of time. Every attempt to increase her diet brought all her former symptoms. At the end of this time I put her upon duodenal feedings in the manner described in the previous cases. She kept the duodenal tube *in situ* for thirty-two days continuously without having it removed once, and without the slightest untoward symptoms. From the end of the first forty-eight hours she was free from all her subjective symptoms. At the end of the third week her bowel actions were reduced to one normal stool daily, and at the end of the fourth week the feces were free from occult blood. The tenderness had disappeared from the epigastrium, although there was still a sensitive area over the sigmoid. At the present time she has been on nearly a normal diet and has been about the house for some weeks; her blood is normal, and she has regained her normal weight and strength.

Such cases as these I could multiply many times over in my experience to illustrate the great reliability and usefulness of duodenal feeding in similar cases.

Einhorn in some cases of gastric ulcer, recommends the local application of healing agents by painting argyrol in nearly insoluble form on the tube at the point where it rests against the ulcer. I have not had a large experience with this method, but I have administered various drugs through the tube for other conditions arising during the course of duodenal feeding. In the diarrheas which so often accompany duodenal ulcer, prompt relief is often secured by 1 grain of argyrol in 1 ounce of warm starch water given through the tube. Flatulence caused by the milk not agreeing perfectly can often be controlled by the addition of 30 drops of glycerin to the feeding. If flatulence still persists, 5 drops of ichthyol in a little water through the tube is generally followed by good results. Where the stool shows deficiency of bile we have often seen the yellow bile color reappear promptly upon the administration of 1 or 2 minims of dilute hydrochloric acid in 1 ounce of water through the duodenal tube.

Apart from the treatment of ulcers, duodenal alimentation may be employed with benefit in some other cases. I have secured happy results in the treatment of duodenal catarrh by using a long duodenal tube. Warm Carlsbad water can also be administered through the tube at the same time.

In one case of cancer of the stomach in which there was marked dysphagia and a sensation of closing up of the throat, so that partial starvation was resulting from the patients failing to take sufficient nourishment, I was, after two attempts, able to get the tube to pass the pylorus, and the patient was afforded considerable relief, and his strength improved for a time, by feeding through it.

There is another class of cases in which results have been most striking—namely, cases of visceroptosis of marked degree, with ischochymia, where it seems as if the stomach is incapable of emptying itself and passing along sufficient of the forced feeding to increase weight and restore the general tone. This to my mind is a strong indication for duodenal alimentation.

The stomach is given a rest, and at the same time food can be introduced into the body in sufficient quantities to cause increase in weight and improvement in muscle tone. A striking example of this is the case of Mrs. D. T. D., who was emaciated, and had a marked visceroptosis, with ischochymia. The lower border of her stomach was three fingers' breadth below the navel. She took the tube for twenty-one days and again for fifteen days. She did well from the start, and the gain was spectacular. Altogether she has gained 34 pounds, and it seems to be permanent. Previous to the duodenal feeding she had made but little progress.

Miss R. A. had marked enteroptosis for seven years, which had been treated without benefit by many physicians. She was much emaciated and a pitiable object. A long rest cure with forced feeding helped but little, but after a course of duodenal feeding she has made marked progress, and has gained 40 pounds.

I consider that duodenal feeding constitutes a mark of great progress in medicine, filling a long-felt want, a method of resting the stomach, and at the same time affording the economy abundant nourishment. In those cases in which it is indicated the results are most gratifying.